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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/971,958	10/09/2001	Motoshige Igarashi	50090-447	4102

7590 08/08/2003

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EXAMINER

QUACH, TUAN N

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 08/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/971,958

Applicant(s)

IGARASHI ET AL.

Examiner

Tuan Quach

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-20 is/are pending in the application.
- 4a) Of the above claim(s) 12-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 15, 2003 has been entered.

Claims 1 and 3-20 are pending. Claim 2 has been cancelled. Claims 1, 5-7 are amended. Claims 12-20 stand withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 6.

Claim 1, 3-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

"a substantially uniform thickness" in claim 1 last line, claims 5-7 penultimate paragraph, is indefinite; what constitutes "substantially uniform thickness" is vague and is not defined or characterized in the specification to permit one skilled in the art to determine the metes and bounds of the claimed invention and its patentability with regard to the prior art, particularly in view of the fact that applicant is relying at least in part upon such "substantially uniform thickness" to overcome the applied prior art.

In claim 7 line 9, "said second insulating film" lacks antecedent basis. It cannot be determined from this claim what constitute the second insulating film, where such

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insulating film is positioned. In claim 7 penultimate line, "substantially equal" is vague as to what would be substantially equal. The specification does not define how difference the sum of thickness versus the lateral length would be to constitute substantially equal.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Akamatsu et al. (Akamatsu) and Yu or Mori et al. (Mori).

Akamatsu is applied as previously (Paper No. 10, page 3, lines 3-8). Although Akamatsu does not show the first insulator contact the substrate, such would have been obvious since it corresponds to conventional processing and structure where the gate and the gate oxide is patterned together as shown in Yu, Fig. 2, column 6 lines 34-38 or

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Mori, Fig. 8. The "substantial uniform thickness" recitation would have been obvious or otherwise met since Akamatsu does not preclude such "substantially uniform thickness, does cover the sidewall of the gate electrode and does not require the thickness to be substantially nonuniform and in view of the vagueness of the claimed invention as to the degree of uniformity in thickness required in such layer and in view of the insufficient characterization in the instant specification wherein what constitutes a substantially uniform thickness is insufficiently defined or characterized. The uniform thickness further would have been desired and thus would have been obvious.

Yu teaches forming gate 31 on gate dielectric 34 including the conventional patterning of both layers, forming L-shaped insulating 34. The "substantial uniform thickness" recitation would have been obvious for similar reasons.

Mori teaches gate 23 on gate dielectric 22a including the conventional patterning of both, the L shaped insulating layer and the second insulating layer 24a and 32a. The lateral leth which correspond to LDD is also shown. See Fig. 8, normal transistor, [0071-79].

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Akamatsu and Yu or Mori. Regarding the second insulating layer such would have been obvious as shown in Akamatsu layer 12 and Yu layer 30, Mori layer 24a. The functional recitation of etchstopper does not impart patentability into the structure claim and in view of the fact that no etching is claimed. Additionally, the use of a layer as etchstop layer is well within the purview of one skilled in the art in etching wherein such use of a layer as etchstop layer facilitates in stopping an etching of a subsequent layer using

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selective etching and is well known in the art as evidenced in Akamatsu column 7 line 39.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Akamatsu and Yu or Mori. Regarding the lateral length of the first insulating layer is twice the thickness or more, such would have been obvious in Akamatsu as evidenced in the figures, e.g., Fig. 2a-2c. Additionally, such would have been further obvious given the thickness of the layer 16 being 40 to 60 nm which is employed to pattern the lateral thickness of the L-shaped spacer 15a and as layer 15a is deposited at a thickness of 10 to 20 nm. Additionally, such would have been obvious further in view of Yu wherein the width of the extension 25 is preferably 500 to 600 angstroms for a layer 34 of 100 to 200 angstrom thickness, column 4 line 20 to column 3 line 26, and as shown in Mori wherein layer 24a would be employed to define the lateral length during patterning thus corresponds thereto.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Akamatsu and Yu or Mori as applied to claim 1 above, and further in view of JP 11-274300.

The subject matter claimed in this claim would have been further obvious in view of '300 for the reasons delineated in Paper No. 10 page 3 last three lines, page 4 lines 1-3.

Claims 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akamatsu and Yu or Mori as applied to claim 1 above, and further in view of Ohno.

The subject matter claimed in these claims would have been further obvious in view of Ohno for the reasons delineated in Paper No. 10 page 4 lines 6-14.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Akamatsu and Yu or Mori as applied to claim 1 above, and further in view of Braeckman et al.

The subject matter claimed in these claims would have been further obvious in view of Braeckelmann et al. for the reasons delineated in Paper No. 10 page 4 line 17 to page 5 line 2.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Akamatsu and Yu or Mori.

Regarding claim 7, Akamatsu is applied as above. To the extent the claim encompasses the first insulating layer being in contact with the substrate, although Akamatsu does not show the first insulator contact the substrate, such would have been obvious since it corresponds to conventional processing and structure where the gate and the gate oxide is patterned together as shown in Yu or Mori as delineated above. The "substantial uniform thickness" recitation would have been obvious or otherwise met since Akamatsu does not preclude such "substantially uniform thickness, does cover the sidewall of the gate electrode and does not require the thickness to be substantially nonuniform in view of the vagueness of the claimed invention as to the degree of uniformity in thickness required in such layer and in view of the insufficient characterization in the instant specification wherein what constitutes a substantially uniform thickness is insufficiently defined or characterized. The uniform thickness further would have been desired and thus would have been obvious.

Yu teaches forming gate 31 on gate dielectric 34 including the conventional patterning of both layers, forming L-shaped insulating 34. The "substantial uniform thickness" recitation would have been obvious for similar reasons.

Mori teaches gate 23 on gate dielectric 22a including the conventional patterning of both, the L shaped insulating layer and the second insulating layer 24a and 32a. The lateral length which correspond to LDD is also shown. See Fig. 8, normal transistor, [0071-79].

Regarding the limitation in claim 7 last three lines reciting the sum of the thickness of the first insulating film and the thickness of the insulating film on the sidewall of the gate electrode is substantially equal to the lateral length of the first insulating film at the side of the gate electrode, the selection and optimization of such layer thicknesses and desired lateral length would have been encompassed in the magnitude of the respective layer thicknesses in Akamatsu and further would have been obvious as substantially shown in Akamatsu Fig. 2(c) and as delineated in Akamatsu wherein the thickness of layer 15 being 10 to 20 nm; the thickness of layer 16 being 40 to 60 nm; and the thickness of layer 12 being 30 to 50 nm. Such would have been further obvious as evidenced by Yu column 4 lines 20-31 and by Mori [0077] to obtain the desired LDD length.

Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akamatsu and Yu or Mori and Wolf et al. (Wolf).

The references are applied as above. Regarding the thickness on the sidewall being less than the thickness on the top surface or surface of the substrate, would have

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been further obvious as evidenced by Wolf, page 368 and Fig. 32 evidencing the step coverage would depend upon the surface of the underlying structure, including the shape and the slope thereof, and as shown in Fig. 32(b) wherein the thickness on top of the structure is greater than that at the sidewall or at the bottom surface. Additionally, the "greater" or "smaller" claimed in these claims do not provide any sufficient demarcation from the prior art and such would have been within the purview of one skilled in the art and would have been expected or otherwise met from the prior art given the slight variance due the vertical sidewalls and the horizontal flat surface of the gate and source/drain regions.

Applicant's arguments with respect to claims 1, 3-11 have been considered but are moot in view of the new ground(s) of rejection.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Matsumoto et al., Chang et al., Yeh et al., Zhou et al., Pradeep et al. are made of record.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Quach whose telephone number is 703-308-1096. The examiner can normally be reached on M - F from 9 to 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Wael Fahmy can be reached on (703) 308-4918. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318 (Before Final) and (703) 872-9319 (After Final).

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



Tuan Quach
Primary Examiner